

Patent claims

1. Method for determination of the stress on a turbine machine (1) with turbine blades (4) arranged on a rotor shaft (3) mounted to rotate within a housing (2), whereby through means arranged between blade rows (5, 8, 81, 82, 83) to generate at least one electromagnetic wave, at least one electromagnetic wave (31) is emitted in a turbine channel (6) in an area of the turbine blades (4) which at least partly reflects the at least one electromagnetic wave (31) from at least one turbine blade (4), the reflected part (32) of the at least one electromagnetic wave is received by receiving means arranged between the blade rows (7, 8, 81, 82, 83) and from a signal corresponding to the at least one electromagnetic wave received the stress on the turbine blades (4) is determined.

2. Method for determination of the stress on a turbine machine (1) with guide vanes (11) arranged for fixed rotation within a housing (2), whereby through means arranged between rows of guide vanes (5, 8, 81, 82, 83) to generate at least one electromagnetic wave, the at least one electromagnetic wave (31) is emitted in a turbine channel (6) in an area of the guide vanes (11) between the blade rows which at least partly reflects the at least one electromagnetic wave (31) from at least one guide vane (11), the reflected part (32) of the at least one electromagnetic wave is received by receiving means arranged between the blade rows (7, 8, 81, 82, 83) and from a signal corresponding to the at least one electromagnetic wave received the stress on the guide vanes (11) is determined.

3. Method in accordance with claim 1 and 2, characterized in that, on the rotor shaft (3) of the turbine machine (1) provided with turbine blades (4) and guide vanes (11) both the stress on the turbine blades (4) and also the stress on the

guide vanes (11) is determined, whereby through means (5, 8, 81, 82, 83) arranged between the turbine blade rows and the guide vane rows to generate the at least one electromagnetic wave, the at least one electromagnetic wave (31) in the turbine channel (6) in the area of the turbine blades (4) and the guide vanes (11) is emitted between the turbine blade rows and guide vane rows and the reflected part (32) of the at least one electromagnetic wave is received by receive means (7, 8, 81, 82, 83) arranged between the turbine blade rows and the guide vane rows.

12. Method in accordance with one of the claims 8 to 11, characterized in that the vibration status of the blades is determined from a frequency comparison between the at least one emitted and the at least one received electromagnetic wave (32).

13. Method in accordance with one of the previous claims, characterized in that the surface quality and the vibration status are simultaneously determined as a measure for the stress.

14. Device for carrying out the method in accordance with one of the previous claims (9) for generating an electrical vibration, means (5, 8) arranged between the turbine blade rows and the guide vane rows for generating at least one electromagnetic wave (31) from the vibration, means (7, 8) arranged between the turbine blade rows and the guide vane rows for receiving at least one electromagnetic wave (32) and with an evaluation unit (10) for evaluating the at least one receivable electromagnetic wave (32).

15. Device in accordance with claim 14, characterized in that the means (8) for generating at least one electromagnetic wave is suitable both for sending and for receiving at least one electromagnetic wave (31, 32).

16. Device in accordance with claim 14 or 15, characterized in that the means (5, 8) for generating at least one electromagnetic wave (31) is a radar antenna.

17. Device in accordance with one of the claims 14 to 16, characterized in that the means (5, 8) for generating at least one electromagnetic wave (31) is arranged in the turbine channel (6) of the turbine machine (1), especially of a gas turbine.